

## Abstract

This report presents the results of groundwater monitoring for fiscal year 2008 on the U.S. Department of Energy's Hanford Site in southeastern Washington. Results of groundwater remediation and vadose zone studies are summarized.

Contaminant plumes occupy an area of ~183 km<sup>2</sup> at levels exceeding one or more drinking water standards, compared to the total area (1,500 km<sup>2</sup>) of the Hanford Site. The most extensive contaminant plumes in groundwater are tritium, iodine-129, and nitrate. These contaminants originated from multiple sources and are mobile in groundwater. The largest portions of these plumes are migrating from the central Hanford Site to the southeast, toward the Columbia River, and concentrations generally are declining. Carbon tetrachloride and associated organic constituents form a large plume beneath the west-central part of the Site. Hexavalent chromium is present in plumes beneath the reactor areas along the river and beneath the central part of the Site. Strontium-90 concentrations exceed drinking water standards beneath portions of all but one of the reactor areas. Technetium-99 and uranium plumes exceeding standards are present in the 200 Area. A uranium plume exceeding standards also underlies part of the 300 Area. Small contaminant plumes with concentrations greater than standards include carbon-14, cesium-137, cis-1,2-dichloroethene, cyanide, fluoride, plutonium, and trichloroethene.

Levels of some contaminants exceed drinking water standards in water samples collected from aquifer sampling tubes along the river shore. The most significant exceedances were strontium-90 in the 100-N Area, chromium in the 100-D Area, and uranium in the 300 Area.

Highlights for fiscal year 2008 include the following:

- Expansion of pump-and-treat systems in the 100-K Area to clean up chromium contamination
- Installation of an innovative, in-ground barrier at the 100-N Area to immobilize strontium-90 before it reaches the Columbia River
- Approval of a final record of decision for carbon tetrachloride remediation in the 200-ZP-1 Operable Unit.

Monitoring for the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* is conducted in 12 groundwater interest areas. The purpose of this monitoring is to define and track plumes and to monitor the effectiveness of remedial actions. One groundwater operable unit in the southern part of the Hanford Site (1100-EM-1 Operable Unit) was removed from the National Priorities List (40 CFR 300, Appendix B) because final remediation goals were reached. In fiscal year 2008, a final record of decision was approved for remediation of the 200-ZP-1 Operable Unit in the 200 West Area. This operable unit has been the subject of an interim remedial action for carbon tetrachloride. Interim groundwater remediation in the 100-K, 100-D, and 100-H Areas, using a combination of pump-and-treat and in situ methods, continued to reduce the amount of chromium reaching the Columbia River. An in situ treatment system for strontium-90 is being implemented in the 100-N Area. A pump-and-treat system for technetium-99 and uranium in the southern part of the 200 West Area also operated in fiscal year 2008.

This report meets annual reporting requirements for *Resource Conservation and Recovery Act of 1976* groundwater monitoring at 24 waste management areas:

- 15 under interim or final status detection programs, with the objective of determining whether or not they are adversely affecting groundwater (Monitoring results for Low-Level Waste Management Area 4 and the Nonradioactive Dangerous Waste Landfill exceeded a critical mean value. These two sites will be monitored under assessment programs in fiscal year 2009.)
- 7 under interim status groundwater quality assessment programs to assess contamination
- 2 under final status corrective-action programs.

During calendar year 2008, drillers completed 113 new wells for monitoring, remediation, or characterization, including six for *Resource Conservation and Recovery Act of 1976* requirements. One hundred three wells that could no longer be used were decommissioned (filled with grout).

This report is available on the Internet through the Hanford Site Groundwater Remediation Project (<http://www.hanford.gov/cp/gpp>).